Appendix 14

AIR QUALITY ANALYSIS USING 5 YEARS OF NWS METEOROLOGICAL DATA

This appendix presents the results of a Class II air quality analysis for the Facility utilizing 5 years of National Weather Service (NWS) meteorological data. This air quality analysis is independent of the primary Class II air quality analysis which is presented in Appendix 8 and summarized within the main body of the application. The analysis contained in Appendix 8 is based on one-year of onsite meteorological data as required by NDEP regulations and policy and fully satisfies the Class II air quality analysis required by NDEP. The analysis contained in this Appendix 14, while not required by NDEP, provides a corroborating check on the validity of the primary analysis. The analysis contained in Appendix 14 is not intended to displace the primary air quality analysis contained in Appendix 8.

14.1 METHODOLOGY FOR NWS MODELING ANALYSIS

WPEA conducted a supplementary air quality analysis using 5 years of NWS meteorological data to compare the predicted impacts of the proposed WPES to the NAAQS and PSD Increments. The five-year period was chosen based on 40 CFR Part 51, Appendix W, Section 9.3.1.2. This NWS modeling analysis was conducted using the following general procedures:

1) **Preliminary Analysis.** Emissions from the WPES sources were modeled at 100% load and compared to the PSD significant impact levels (SILs). For each pollutant with predicted ambient impacts in excess of a SIL, a full impacts analysis was conducted.

2) **Full Impacts Analysis.** Pollutants with ambient impacts in excess of a SIL were modeled in the full impacts analysis for comparison with the NAAQS and PSD increment standards. The full impacts analysis included the WPES, plus nearby facilities. A listing of the nearby facilities and their emission rates is included in Table 14.1. Maximum impacts from the full impacts analysis were added to the on-site background concentrations for comparison with the NAAQS.

Table 14.1 – Nearby Source Inventory Used for Full Impacts Analysis

ID	State	Facility	NO_X (tons/yr)	PM_{10} (lb/hr)	(tons/yr)	SO_2 (lb/hr)	(tons/yr)
171	NV	H E Hunewill Construction	--	107.47	126.25	86.49	123.89
373	NV	Robinson Nevada Mining Co.	28.31	104.43	107.37	5.47	4.24
405	NV	Newmont Gold Co.	--	7.96	23.4	--	--
543	NV	J&M Trucking - Ely	--	0.83	0.66	--	--
713	NV	Homestake Mining Co.	--	0.01	0.06	--	--
835	NV	Reck Brothers	10.28	3.57	3.57	0.92	0.93
1065	NV	Nevada Slag	10.69	6.91	3.84	7.42	6.97
1124	NV	Reed Distributing	--	0.002	0.01	--	--
1177	NV	J&M Trucking - Eureka	--	0.57	0.92	--	--
1336	NV	Bald Mountain Mine - Mooney	--	0.20	0.83	--	--
1362	NV	Bald Mountain Mine - Huntington	2.56	0.35	1.49	0.0006	0.003
1377	NV	Cooper & Sons	14.11	5.85	4.61	4.95	4.45
1417	NV	Country Construction	--	3.30	1.2	--	--
1466	NV	White Pine County Schools	1.44	2.10	3.27	0.11	0.16

ID	State	Facility	NO$_X$ (tons/yr)	PM$_{10}$ (lb/hr)	PM$_{10}$ (tons/yr)	SO$_2$ (lb/hr)	SO$_2$ (tons/yr)
1594	NV	Chevron Environmental Mgt Co.	1.83	--	--	--	--
10706	UT	U.S. Army-Dugway Proving Ground	--	--	--	5.24	22.94

3) **Startup/Shutdown Impacts Analysis.** Emissions during startup and shutdown were modeled and compared to the NAAQS and PSD increment standards.

With the exception of the meteorological data used, the NWS modeling was conducted using the same methodology as the PSD air quality analysis presented in Appendix 8. The NWS modeling analysis methodology is detailed in Table 14.2 below.

Table 14.2 – Methodology for NWS Modeling Analysis

Parameter	Methodology	Notes
Dispersion model selection	AERMOD. Same methodology as presented in Section 8.1.1 of this document.	--
Meteorological data	5 years of NWS meteorological data. Surface data: Ely Regional Airport (WBAN 23154), 1999-2003. Upper air data: Elko Regional Airport (WBAN 24121), 1999-2003.	Meteorological data processing and site characteristic parameters as described in Section 8.1.2 of this document.
Terrain data	7.5-minute DEM data as described in Section 8.1.3 of this document.	--
Land use classification	Rural per the procedures documented in Section 8.1.4 of this document.	--
Receptor grid	Multiple grids as described in Section 8.1.5 of this document.	--
Averaging periods	Varies depending on pollutant.	Complete list of averaging periods provided in Section 8.1.6 of this document.
Aerodynamic downwash analysis	EPA's BPIP algorithm.	Complete details provided in Section 8.1.7 of this document.
Emission rates and stack parameters for modeling.	Emission rates at 100% load with corresponding stack parameters as documented in Appendix 5 of this document.	--

Parameter	Methodology	Notes
Emissions during startup and shutdown.	Modeled one startup for each day fo the 5 years (startup is conservatively representative of shutdown conditions).	Used hourly emissions profile provided in Appendix 5 of this document and methodology documented in Sections 8.1.10 and 8.2.6 of this document.

14.2 RESULTS OF THE NWS MODELING ANALYSIS

This Section presents the results of the NWS modeling analysis performed for the proposed White Pine Energy Station. The analysis was conducted using the inputs and methodologies described in Section 14.1 of this Appendix. All modeling input and output files are included on the CD-ROM contained in Section 14.3 of this Appendix.

14.2.2 Preliminary Analysis

The first step in the air quality impacts analysis is the preliminary analysis to determine if predicted impacts from the proposed facility exceed any applicable SIL. The results of the preliminary analysis are included in Table 14.3. The results indicate that predicted impacts from the WPEA Facility exceed the SILs for NO_2, SO_2 and PM_{10}; therefore, a full impact analysis is performed for these pollutants. Locations of the maximum impacts are shown in Figure 14.1.

Table 14.3 - Results of the Preliminary NWS Modeling Analysis

Pollutant	Averaging Period	Significant Impact Level ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)
CO	8-hour	500	118
	1-hour	2,000	861
NO_2	Annual	1	1.6 [1]
SO_2	Annual	1	2.5
	24-hour	5	26
	3-hour	25	169
PM_{10}	Annual	1	2.3
	24-hour	5	18 [2]
Lead	Quarterly	None	0.0012 [3]

[1] The annual NO_X impact was multiplied by the national default NO_2/NO_X ratio of 0.75 (as recommended in 40 CFR Appendix W) prior to comparison with the SIL.

[2] Highest second-high impact.

[3] Although the averaging time of the standard is quarterly, the maximum impact represents a monthly averaging period for a conservative comparison.
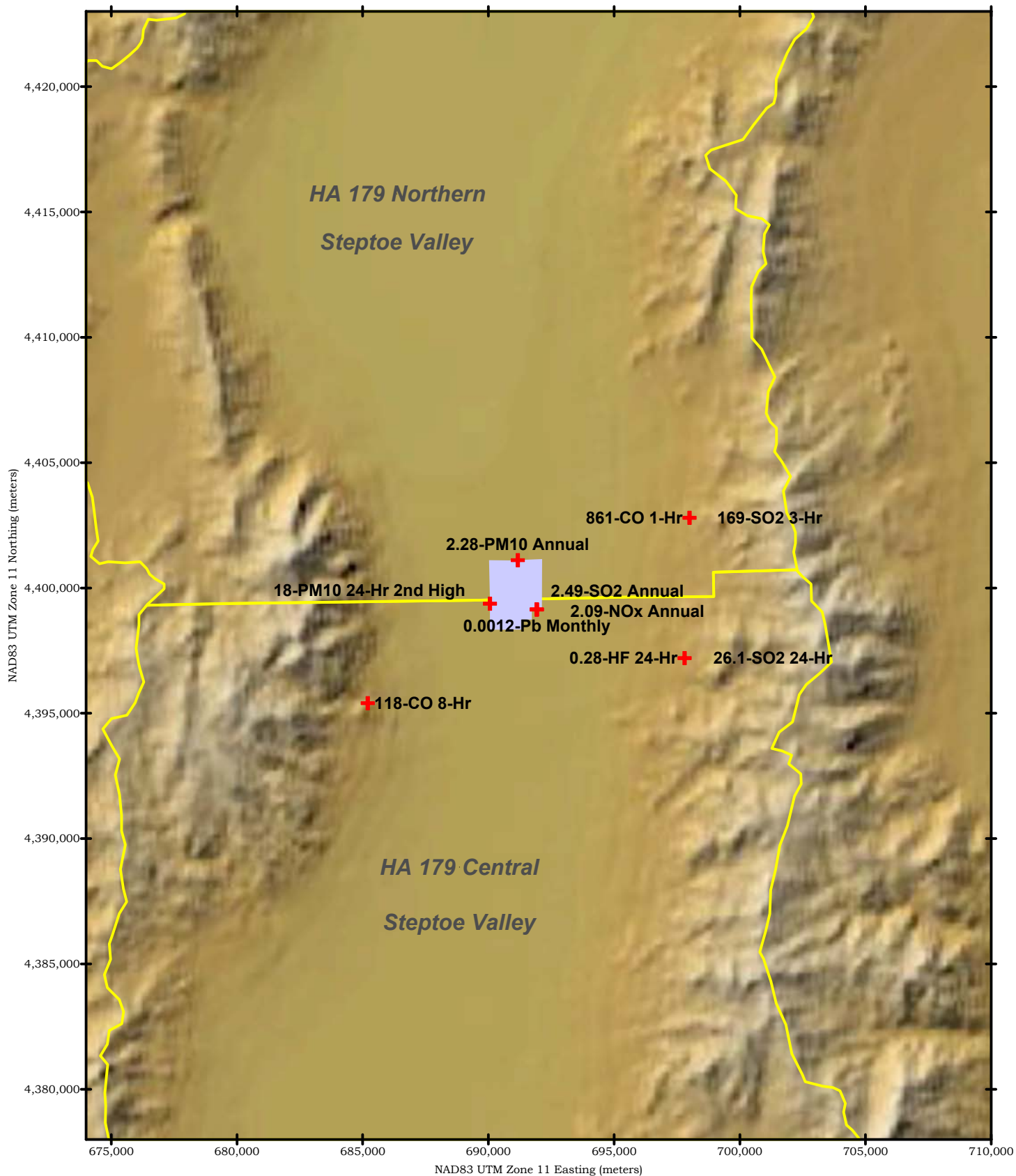
FIGURE 14.1
PRELIMINARY ANALYSIS
MAXIMUM IMPACTS
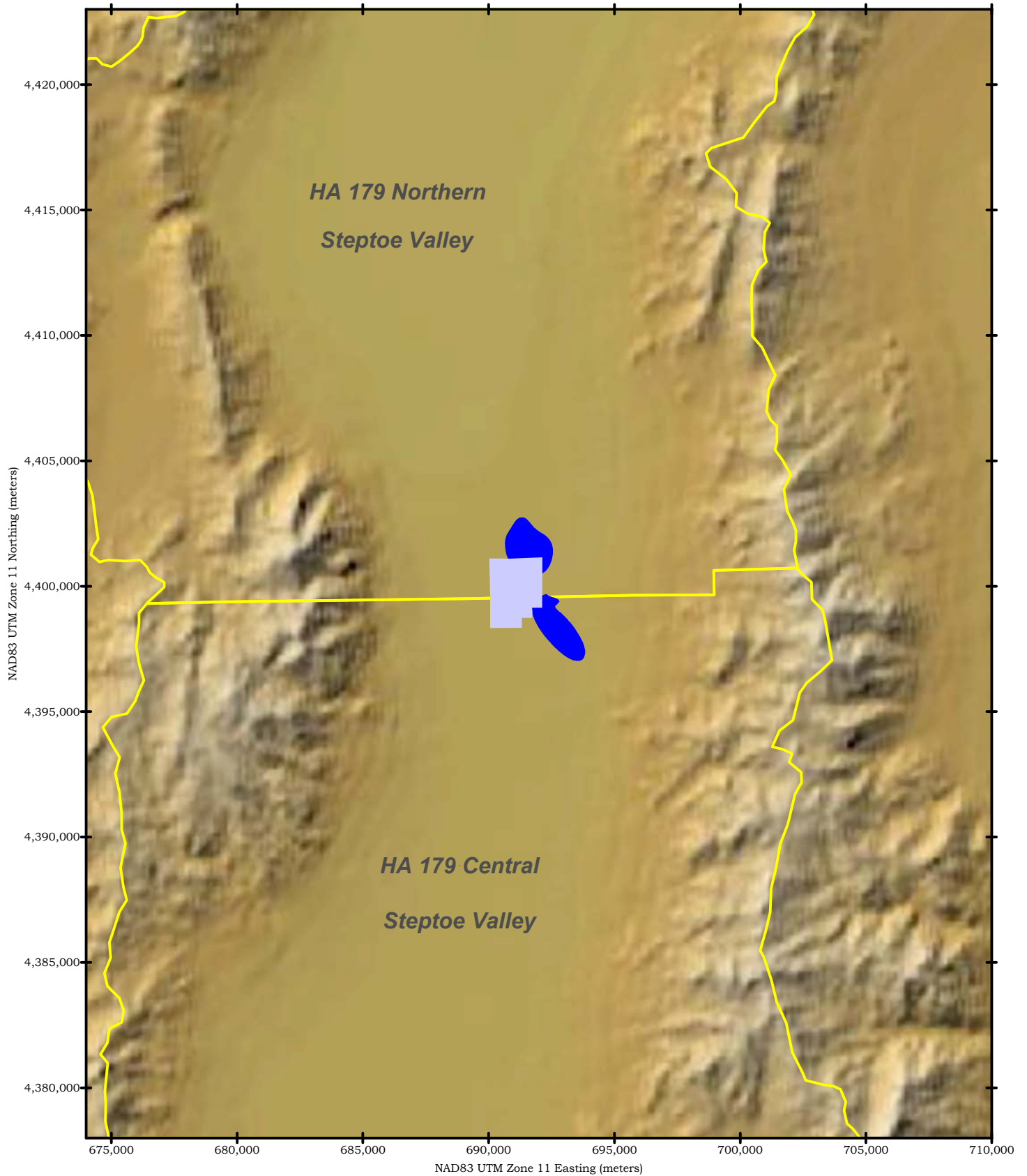5 YEARS NWS MET DATA

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14.2.3   Full Impact Analysis

Since the predicted ambient impacts from the proposed WPEA Facility exceed the SILs for NO_2, SO_2, and PM_{10}, a full impact analysis is conducted for these pollutants. In the full impact analysis, ambient concentrations are analyzed inside the impact area defined by the radius of impact. Table 14.4 shows the radius of impact for the NO_2, SO_2, and PM_{10} modeling runs as determined from the preliminary analyses in accordance with the procedure described in Section 14.1. Significant impact isopleths for NO_2, SO_2, and PM_{10} are shown in Figures 14.2 through 14.7.

Table 14.4 - Radius of Impact for NO_2, SO_2 and PM_{10}

Pollutant	Averaging Period	Radius of Impact (km)
NO_2	Annual	2.5
SO_2	Annual	4.2
	24-hour	35
	3-hour	39
PM_{10}	Annual	3.3
	24-hour	15.5

FIGURE 14.2
PRELIMINARY ANALYSIS
NO2 ANNUAL
SIGNIFICANT IMPACT AREA
5 YEARS NWS MET DATA
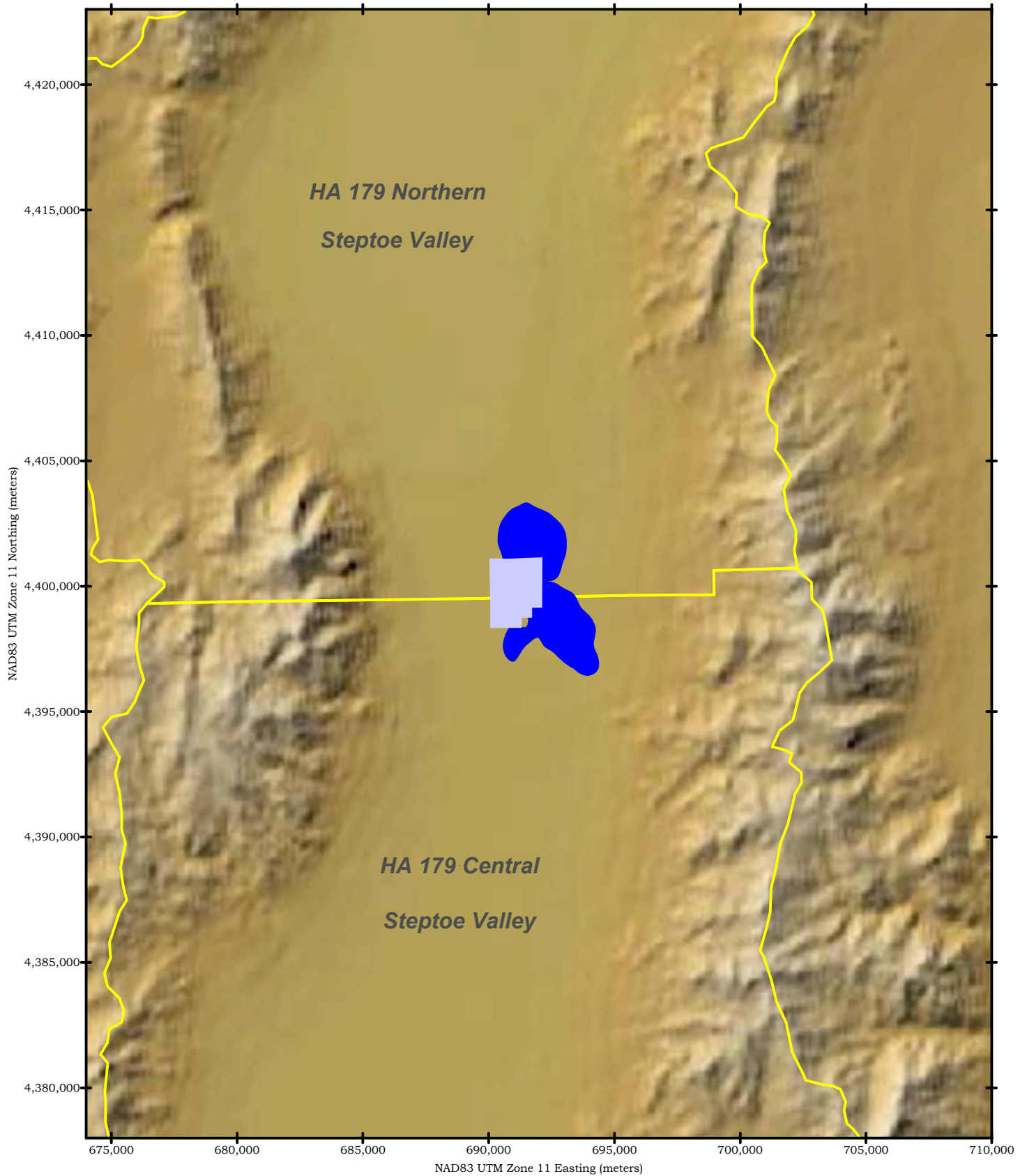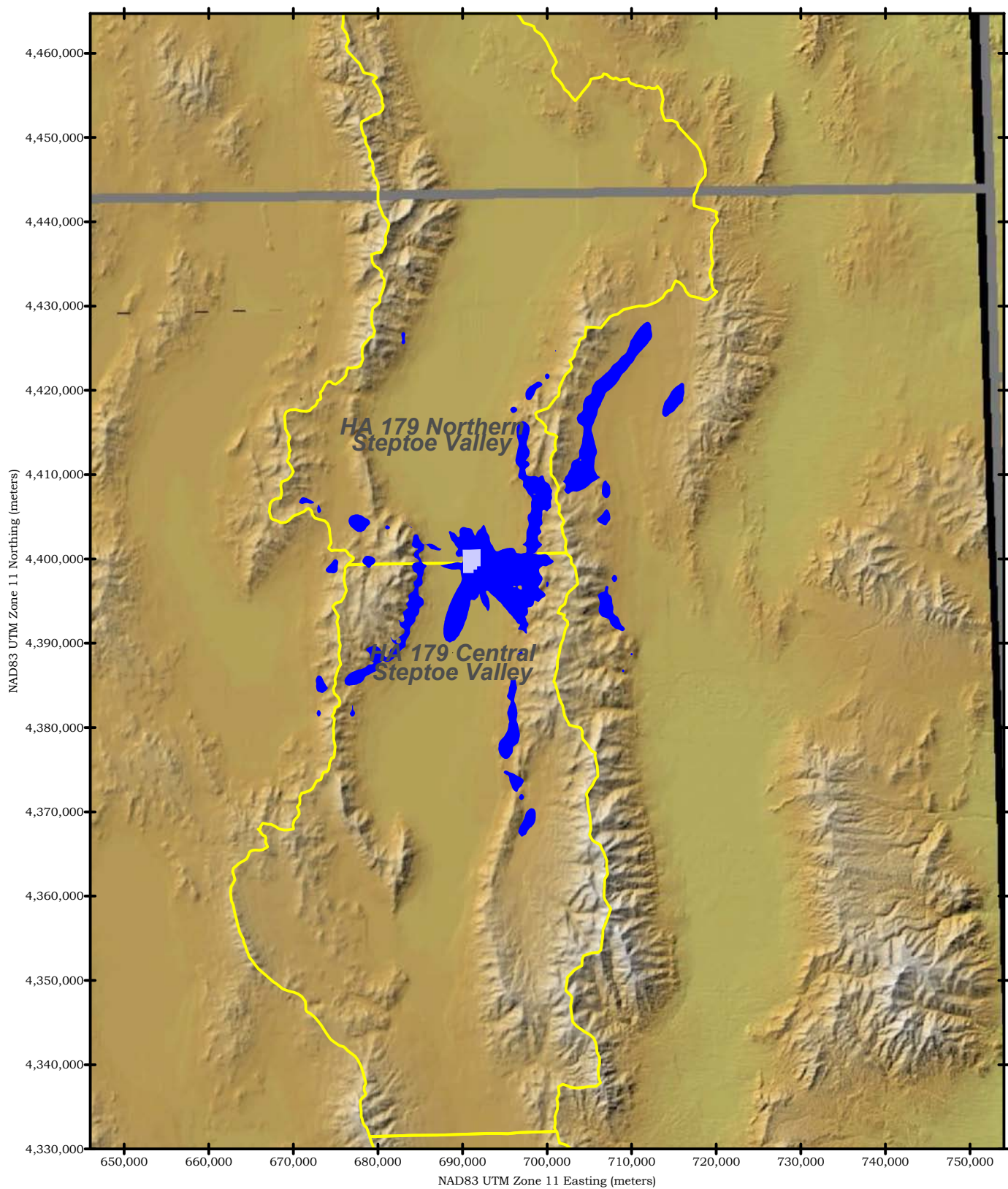**WHITE PINE ENERGY ASSOCIATES**

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HA 179 Northern

Steptoe Valley

HA 179 Central

Steptoe Valley

NAD83 UTM Zone 11 Northing (meters)

NAD83 UTM Zone 11 Easting (meters)

N

1 ug/m3

FIGURE 14.3
PRELIMINARY ANALYSIS
SO2 ANNUAL
SIGNIFICANT IMPACT AREA
5 YEARS NWS MET DATA
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Steptoe Valley

HA 179 Central
Steptoe Valley

NAD83 UTM Zone 11 Northing (meters)

NAD83 UTM Zone 11 Easting (meters)

5 ug/m3

FIGURE 14.4
PRELIMINARY ANALYSIS
SO2 24-HOUR
SIGNIFICANT IMPACT AREA
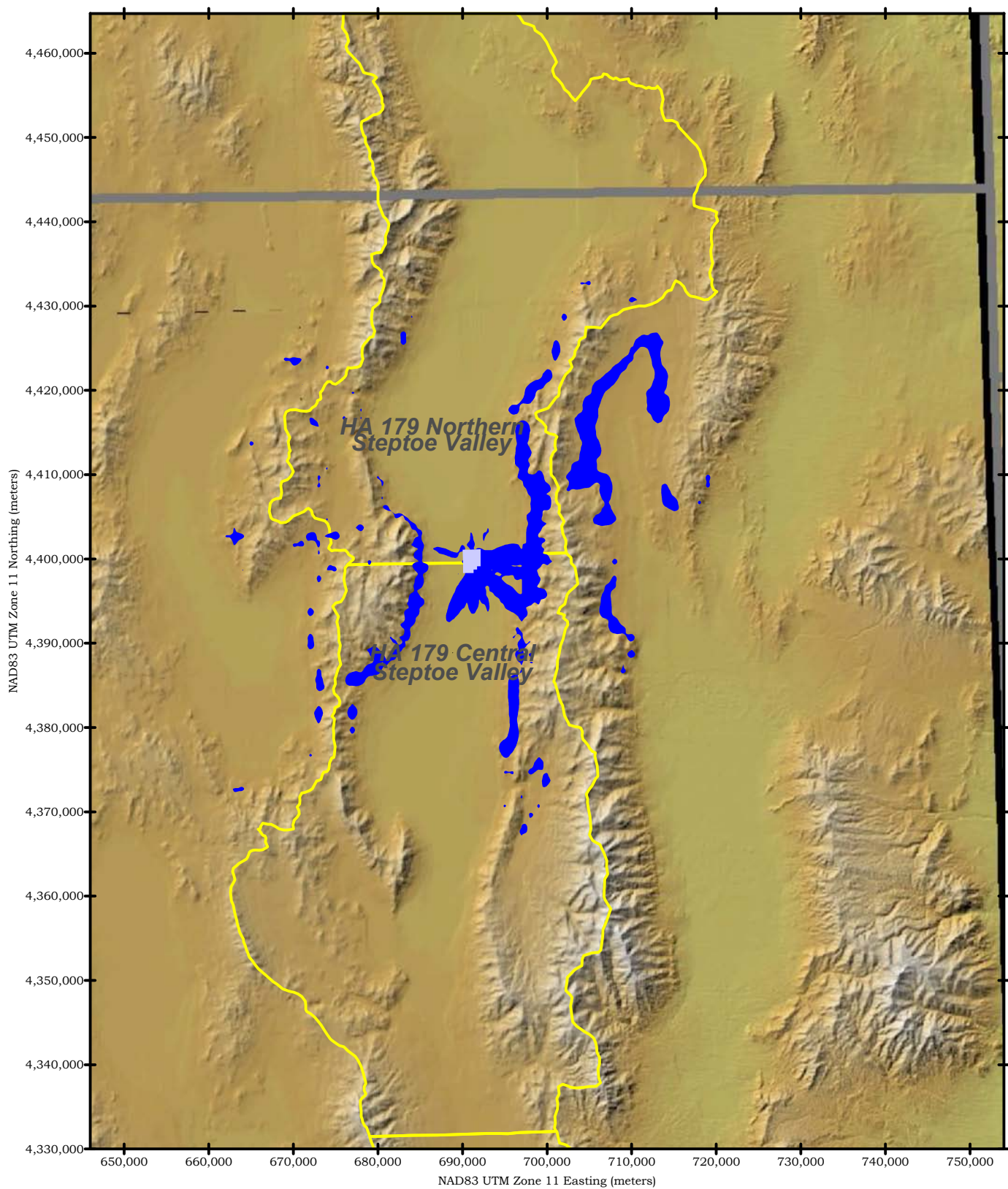**5 YEARS NWS MET DATA**
WHITE PINE ENERGY ASSOCIATES

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FIGURE 14.5
PRELIMINARY ANALYSIS
SO2 3-HOUR
SIGNIFICANT IMPACT AREA
5 YEARS NWS MET DATA
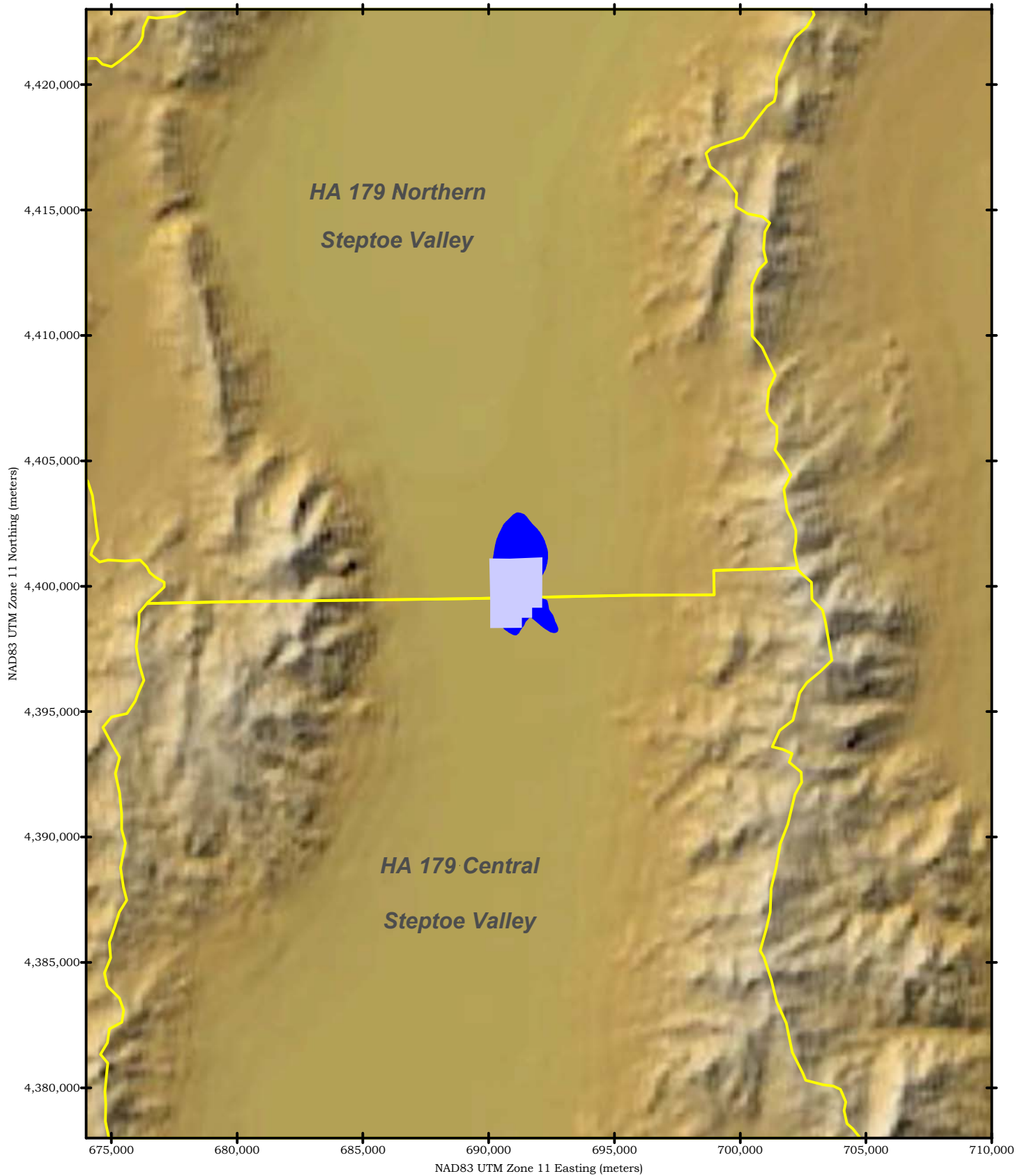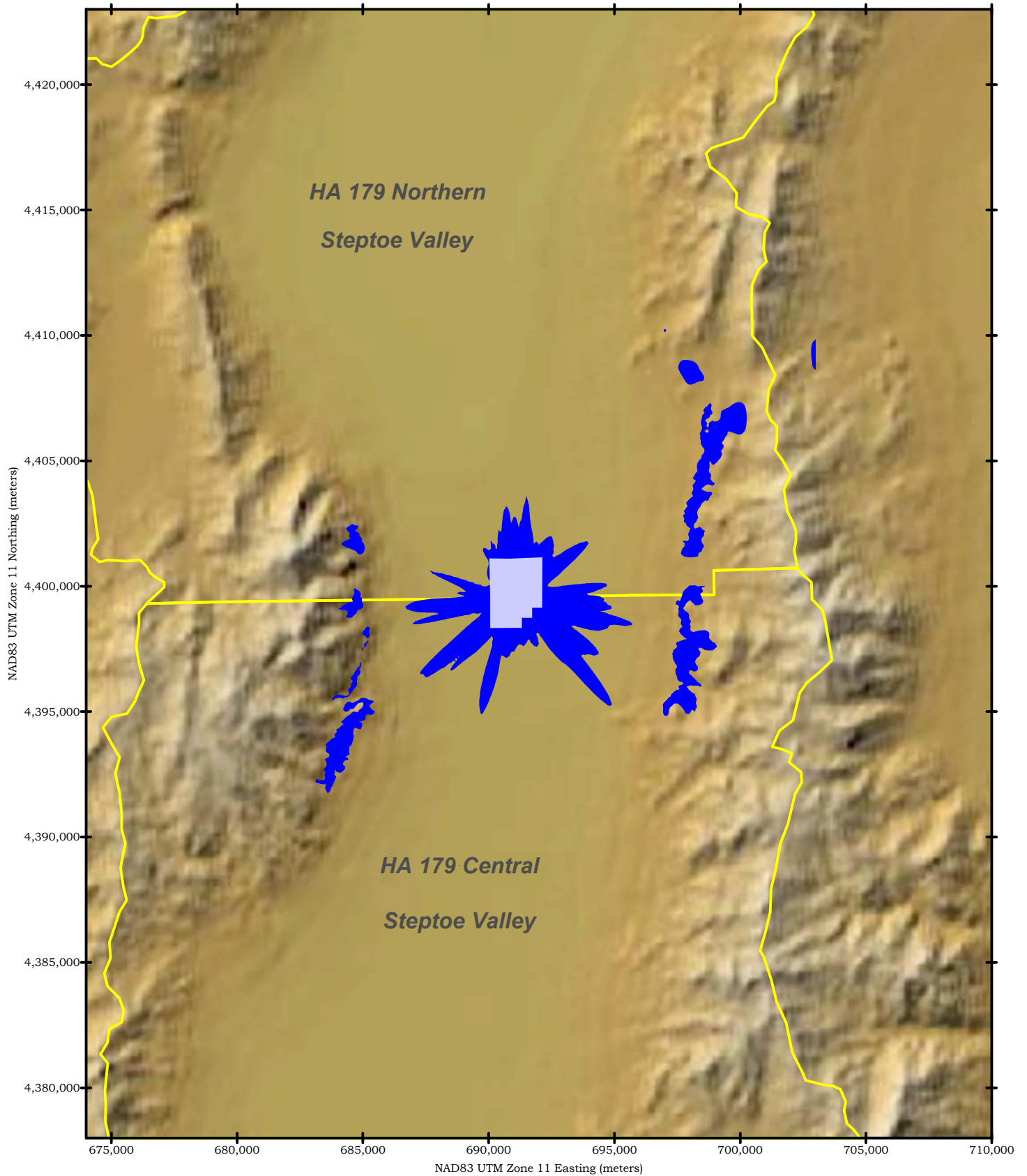WHITE PINE ENERGY ASSOCIATES

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Steptoe Valley

HA 179 Central

Steptoe Valley

NAD83 UTM Zone 11 Northing (meters)

NAD83 UTM Zone 11 Easting (meters)

1 ug/m3

N

FIGURE 14.6
PRELIMINARY ANALYSIS
PM10 ANNUAL
SIGNIFICANT IMPACT AREA
5 YEARS NWS MET DATA
WHITE PINE ENERGY ASSOCIATES

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FIGURE 14.7
PRELIMINARY ANALYSIS
PM10 24-HOUR 1ST HIGH
SIGNIFICANT IMPACT AREA
5 YEARS NWS MET DATA
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Steptoe Valley

HA 179 Central
Steptoe Valley

NAD83 UTM Zone 11 Northing (meters)

NAD83 UTM Zone 11 Easting (meters)

5 ug/m3

N

14.2.3.1 Full Impact Analysis – NAAQS Evaluation with NWS Met Data

As part of the full impact analysis, the maximum predicted post-project concentrations are added to the measured background concentrations for comparison to the NAAQS. Measured background concentrations were obtained as discussed in Appendix 8 of this document. Other emission sources located within the ROI plus 50 kilometers were included in accordance with the methodology described in Section 14.1 of this appendix. The findings of the NAAQS analysis are summarized in Table 14.5. Based on modeling with 5 years of NWS met data, the WPEA Facility is not predicted to cause or contribute to an exceedance of the NAAQS or the Nevada state standards.

Table 14.5 - Summary of the Full Impact Analysis for NAAQS/Nevada State Standards

Pollutant	Averaging Period	Maximum Predicted Impact: Modeled Plus Background ($\mu g/m^3$)	NAAQS / Nevada State Standards ($\mu g/m^3$)
NO_2	Annual	5.4 [1]	100
SO_2	Annual	7.9	80
	24-hour	77	365
	3-hour	361	1,300
PM_{10}	Annual	14.3	50
	24-hour	57 [2]	150

(1)   The modeled annual NO_X impact was multiplied by the national default NO_2/NO_X ratio of 0.75 (as recommended in the 40 CFR 51 Appendix W) before being added to the measured background concentration for comparison to the standard.

(2)   The highest second-high value was added to the background concentration for comparison with the standard.

14.2.3.2 Full Impact Analysis - PSD Increment Evaluation with NWS Met Data

As part of the full impact analysis, the maximum predicted post-project concentrations are compared to the PSD increment standards. Other emission sources located within the ROI plus 50 kilometers were included in accordance with the methodology described in Section 14.1 of this appendix.

The results of the PSD Increment analysis are summarized in Table 14.6. Based on modeling with 5 years of NWS met data, the WPEA Facility is not predicted to cause or contribute to an exceedance of any PSD increment standard. Figure 14.8 is a map showing the location of the maximum impacts predicted in the full impact analysis. Figures 14.9 through 14.14 show the isopleth maps for impacts of NO_2, SO_2, and PM_{10} in the full impact analysis. Background concentrations are not included in the values shown in the figures.

Table 14.6 - Summary of the Full Impact Analysis for PSD Increment Consumption

Pollutant	Averaging Period	Maximum Predicted Impact ($\mu g/m^3$)	PSD Increment ($\mu g/m^3$)
NO_2,	Annual	3.5 [1]	25
SO_2	Annual	5.2	20
	24-hour	69	91
	3-hour	318	512
PM_{10}	Annual	4.3	17
	24-hour[2]	27 [2]	30

[1] The modeled annual NO_X impact was multiplied by the national default NO_2/NO_X ratio of 0.75 (as recommended in the 40 CFR 51 Appendix W) to calculate the predicted NO_2 impact for comparison to the NO_2 Increment.

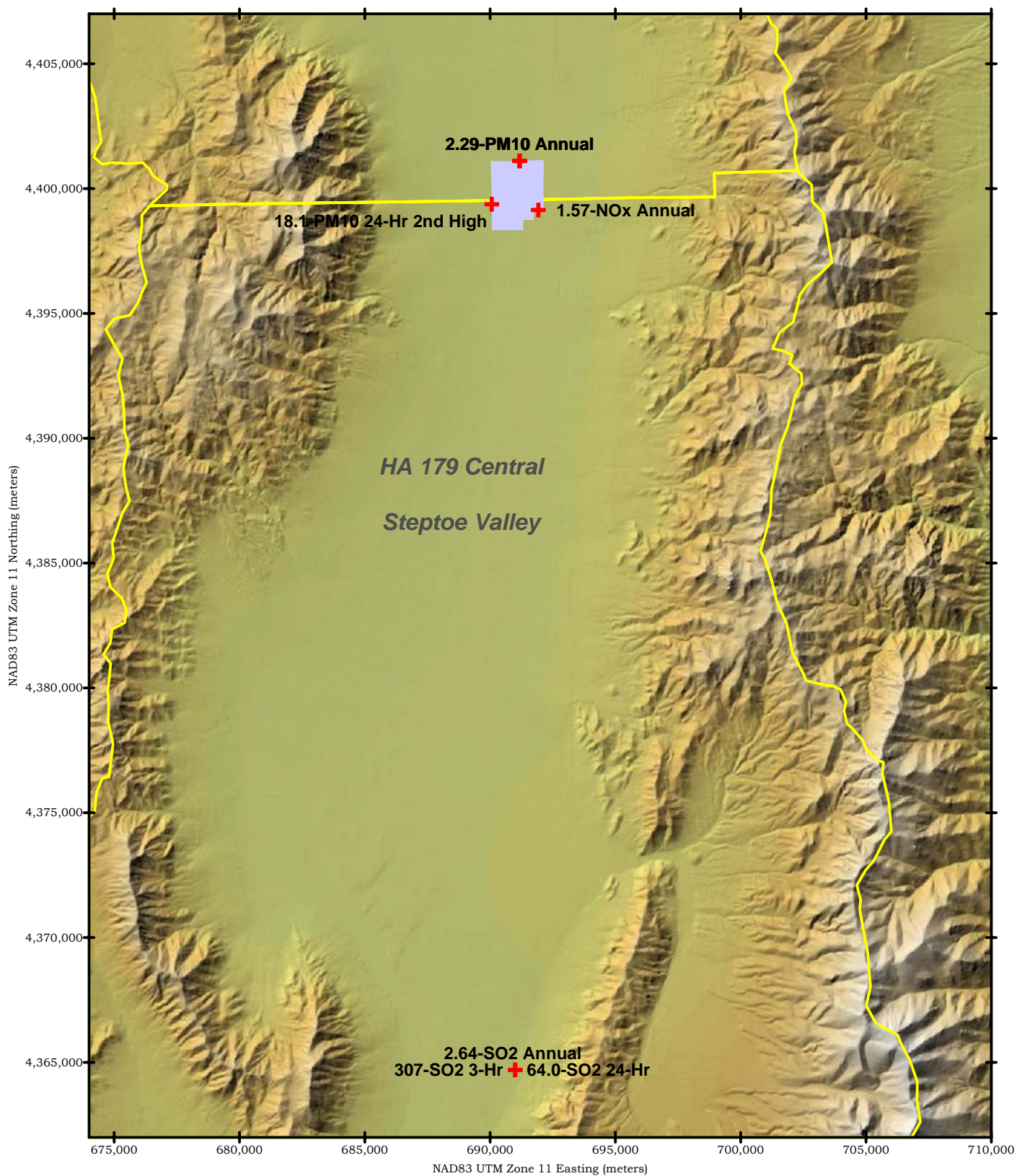[2] The highest second-high value is listed for comparison with the PM_{10} Increment.

2.29-PM10 Annual

18.1-PM10 24-Hr 2nd High

1.57-NOx Annual

HA 179 Central

Steptoe Valley

2.64-SO2 Annual
307-SO2 3-Hr 64.0-SO2 24-Hr

NAD83 UTM Zone 11 Northing (meters)

NAD83 UTM Zone 11 Easting (meters)

FIGURE 14.8
FULL ANALYSIS
MAXIMUM IMPACTS
5 YEARS NWS MET DATA

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HA 179 Northern

Steptoe Valley

HA 179 Central

Steptoe Valley

NAD83 UTM Zone 11 Northing (meters)

4,420,000
4,415,000
4,410,000
4,405,000
4,400,000
4,395,000
4,390,000
4,385,000
4,380,000

675,000   680,000   685,000   690,000   695,000   700,000   705,000   710,000

NAD83 UTM Zone 11 Easting (meters)

N

1 ug/m3   1.1 ug/m3   1.2 ug/m3
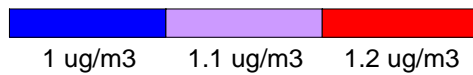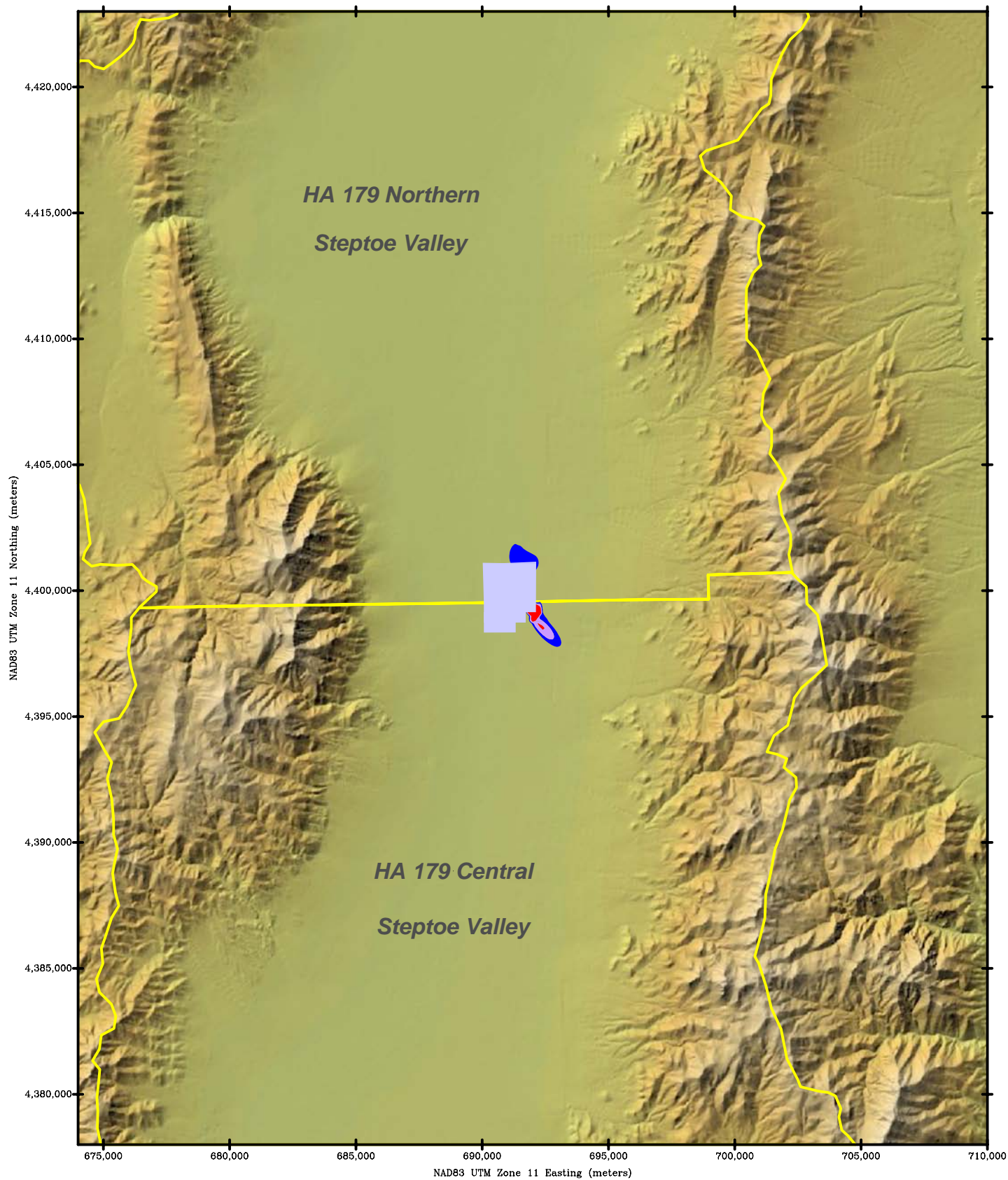
FIGURE 14.9
FULL ANALYSIS
NO2 ANNUAL
MAXIMUM IMPACTS
5 YEARS NWS MET DATA
WHITE PINE ENERGY ASSOCIATES

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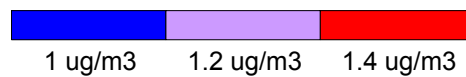
FIGURE 14.10
FULL ANALYSIS
SO2 ANNUAL
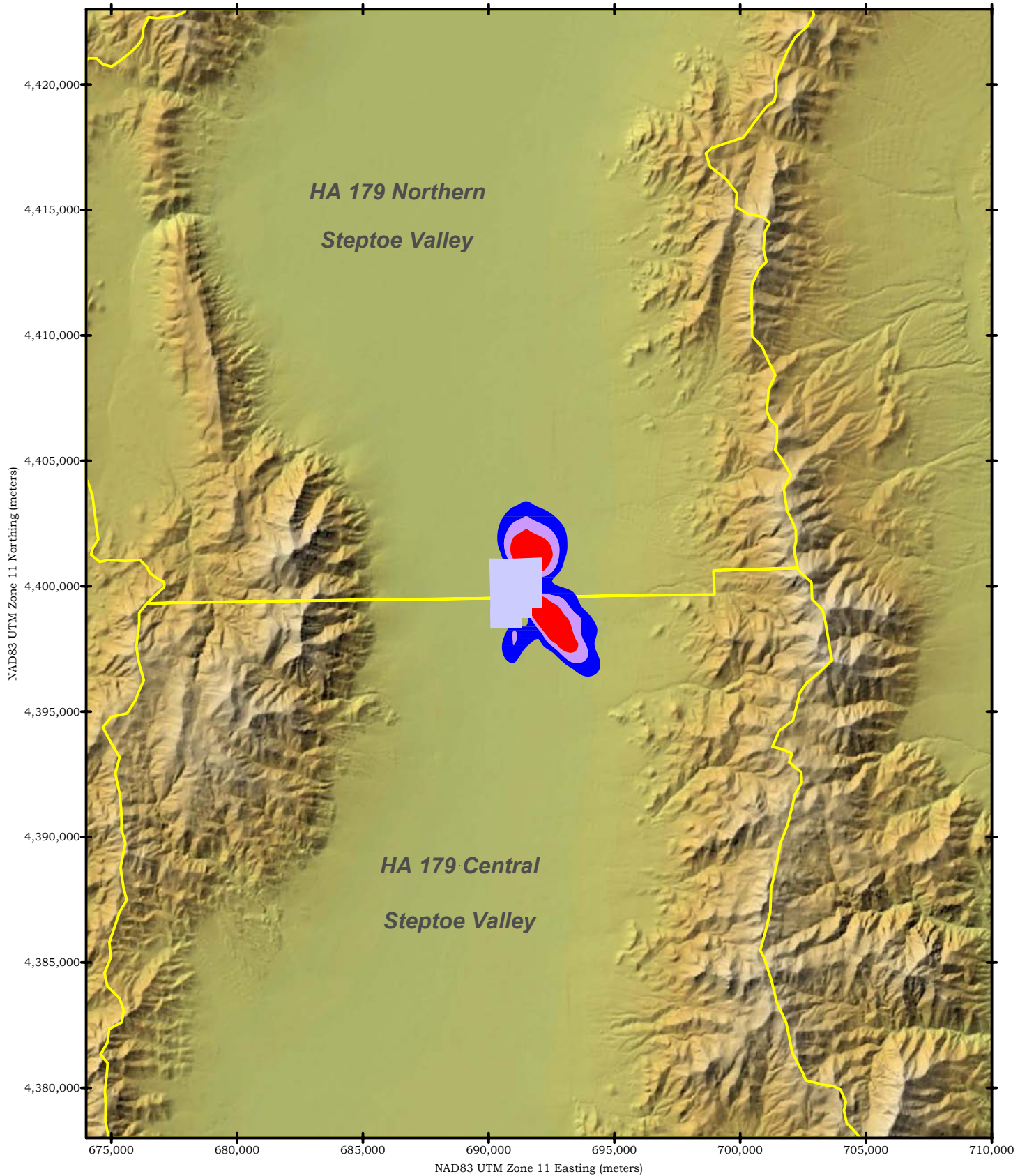MAXIMUM IMPACTS
5 YEARS NWS MET DATA
WHITE PINE ENERGY ASSOCIATES

AIR SCIENCES INC.
GOLDEN, COLORADO
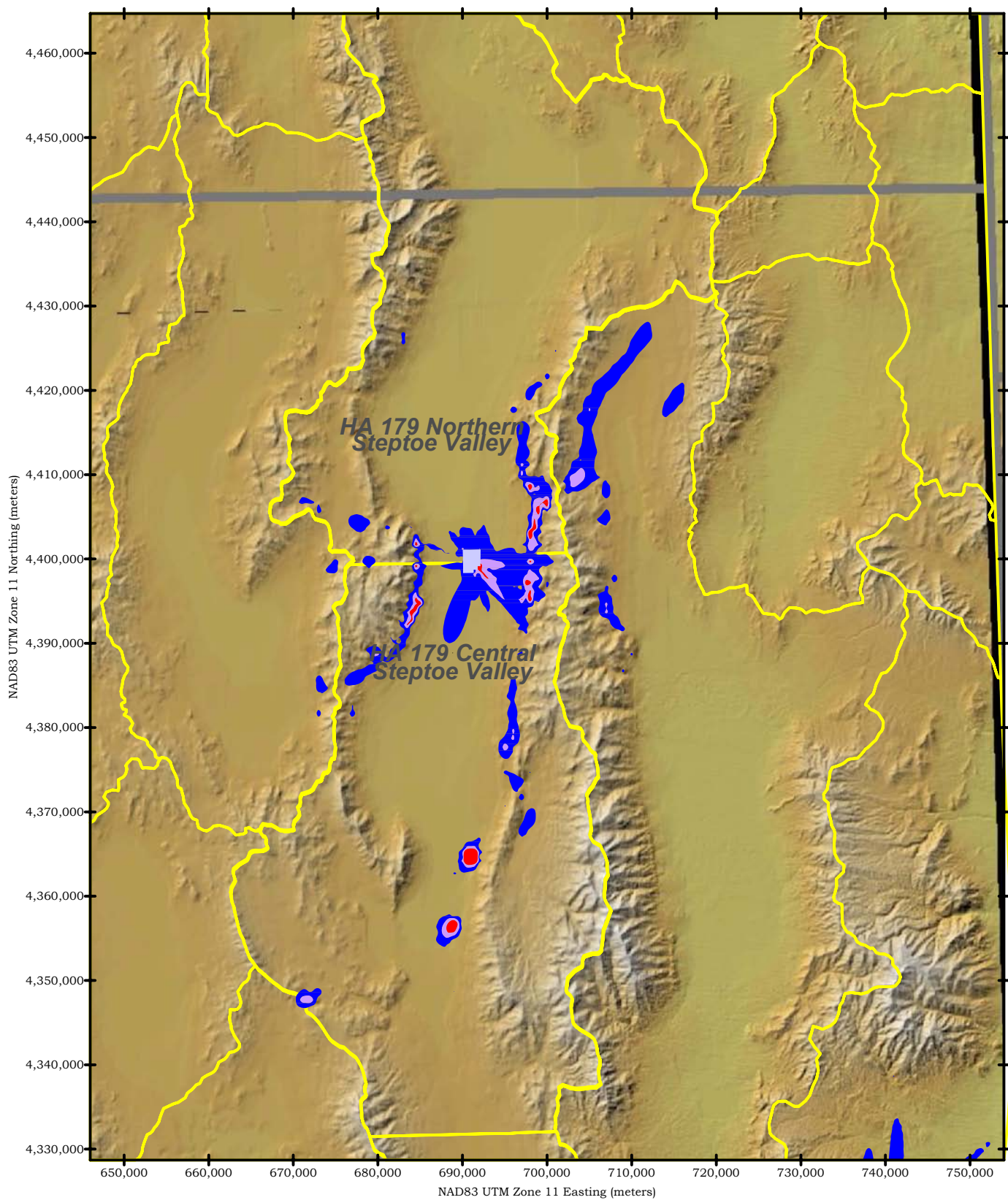
FIGURE 14.11
FULL ANALYSIS
SO2 24-HOUR
MAXIMUM IMPACTS
5 YEARS NWS MET DATA
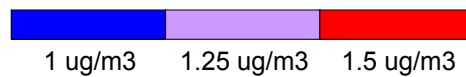WHITE PINE ENERGY ASSOCIATES

AIR SCIENCES INC.
GOLDEN, COLORADO
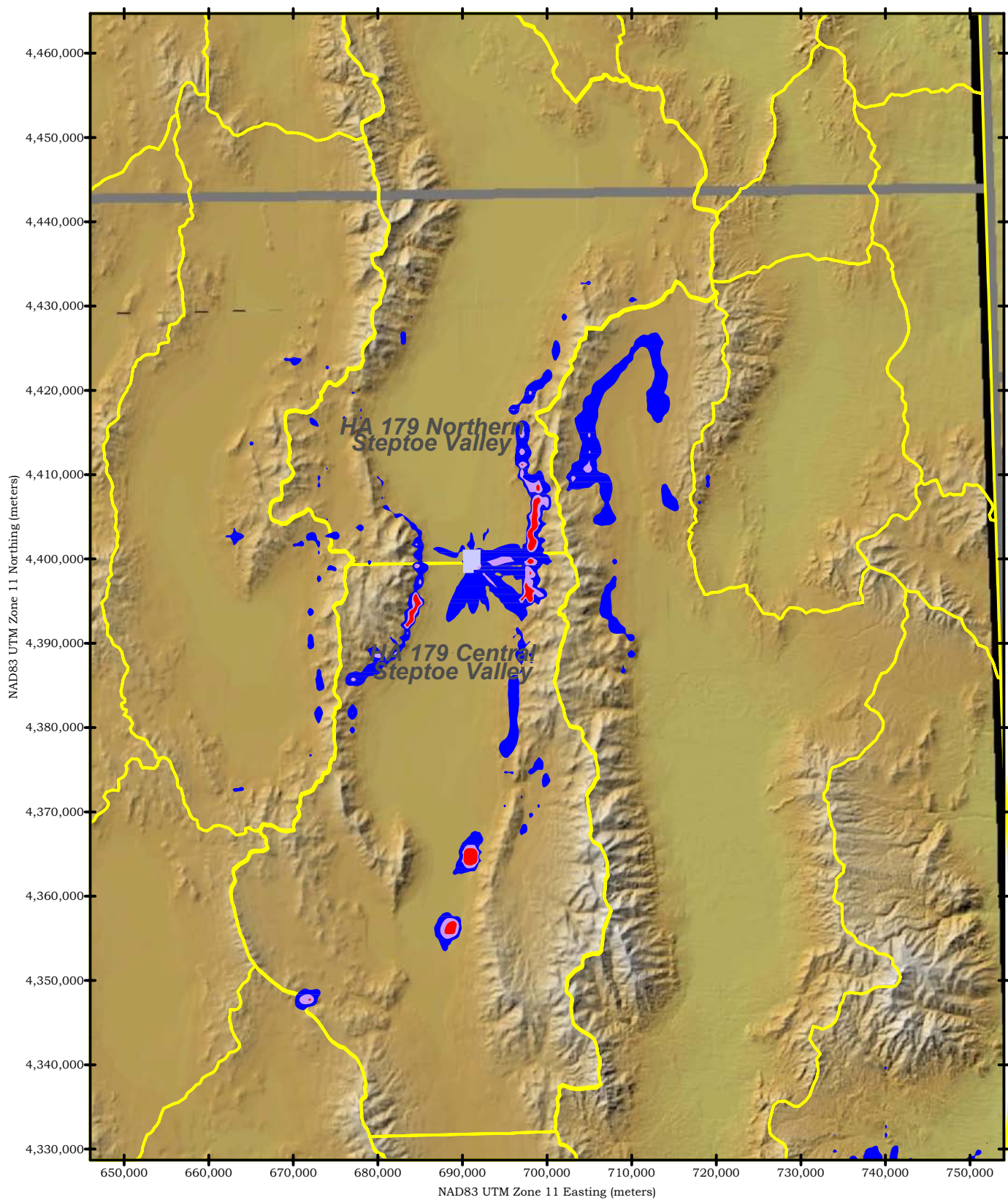
FIGURE 14.12
FULL ANALYSIS
SO2 3-HOUR
MAXIMUM IMPACTS
5 YEARS NWS MET DATA
WHITE PINE ENERGY ASSOCIATES

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HA 179 Northern

Steptoe Valley

HA 179 Central

Steptoe Valley

NAD83 UTM Zone 11 Northing (meters)

NAD83 UTM Zone 11 Easting (meters)

1 ug/m3   1.25 ug/m3   1.5 ug/m3
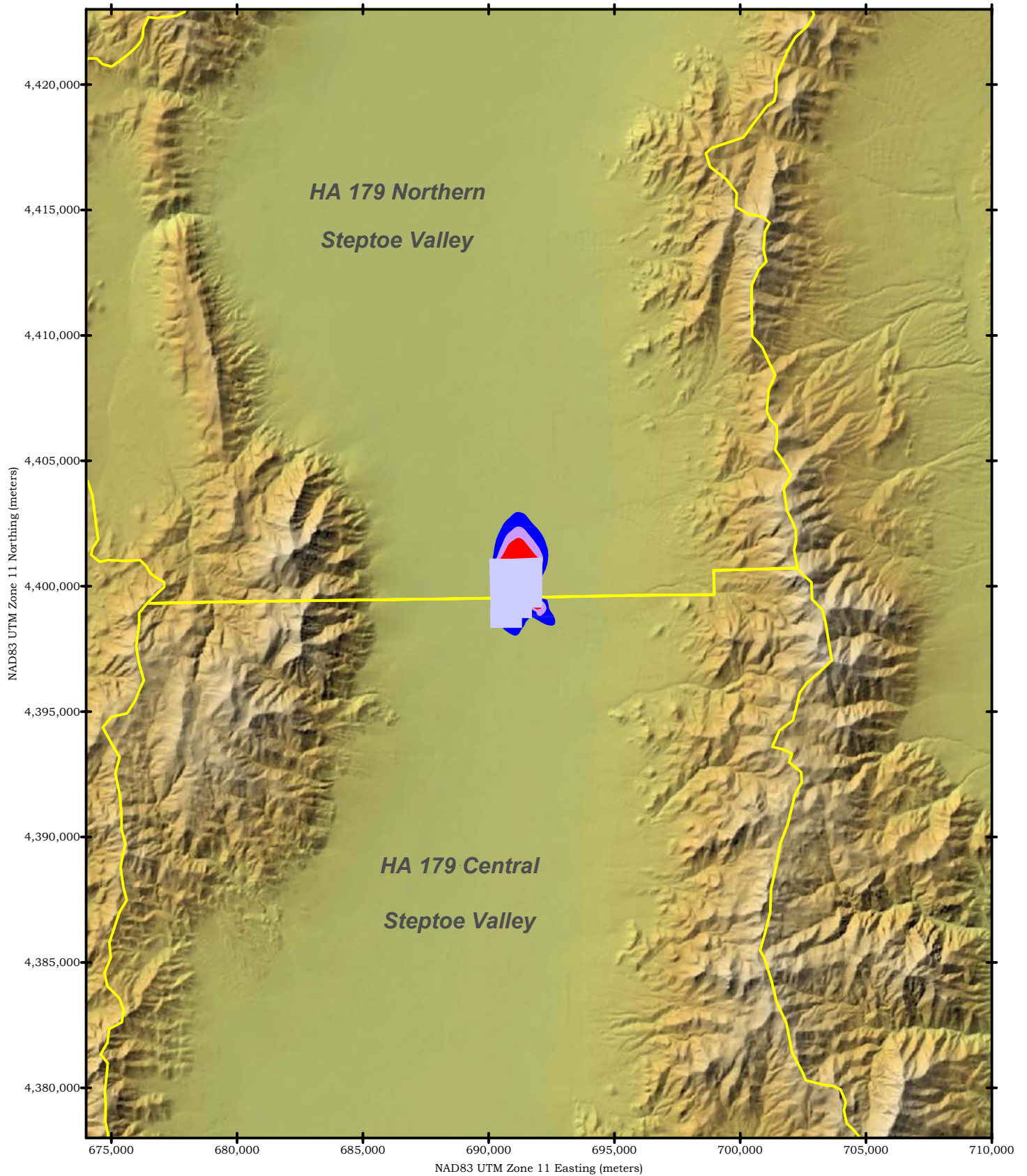
FIGURE 14.13
FULL ANALYSIS
PM10 ANNUAL
MAXIMUM IMPACTS
5 YEARS NWS MET DATA
WHITE PINE ENERGY ASSOCIATES

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HA 179 Northern

Steptoe Valley

HA 179 Central

Steptoe Valley

NAD83 UTM Zone 11 Northing (meters)

NAD83 UTM Zone 11 Easting (meters)

| 5 ug/m3 | 6.5 ug/m3 | 8 ug/m3 |
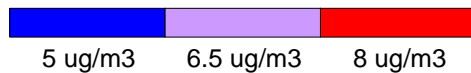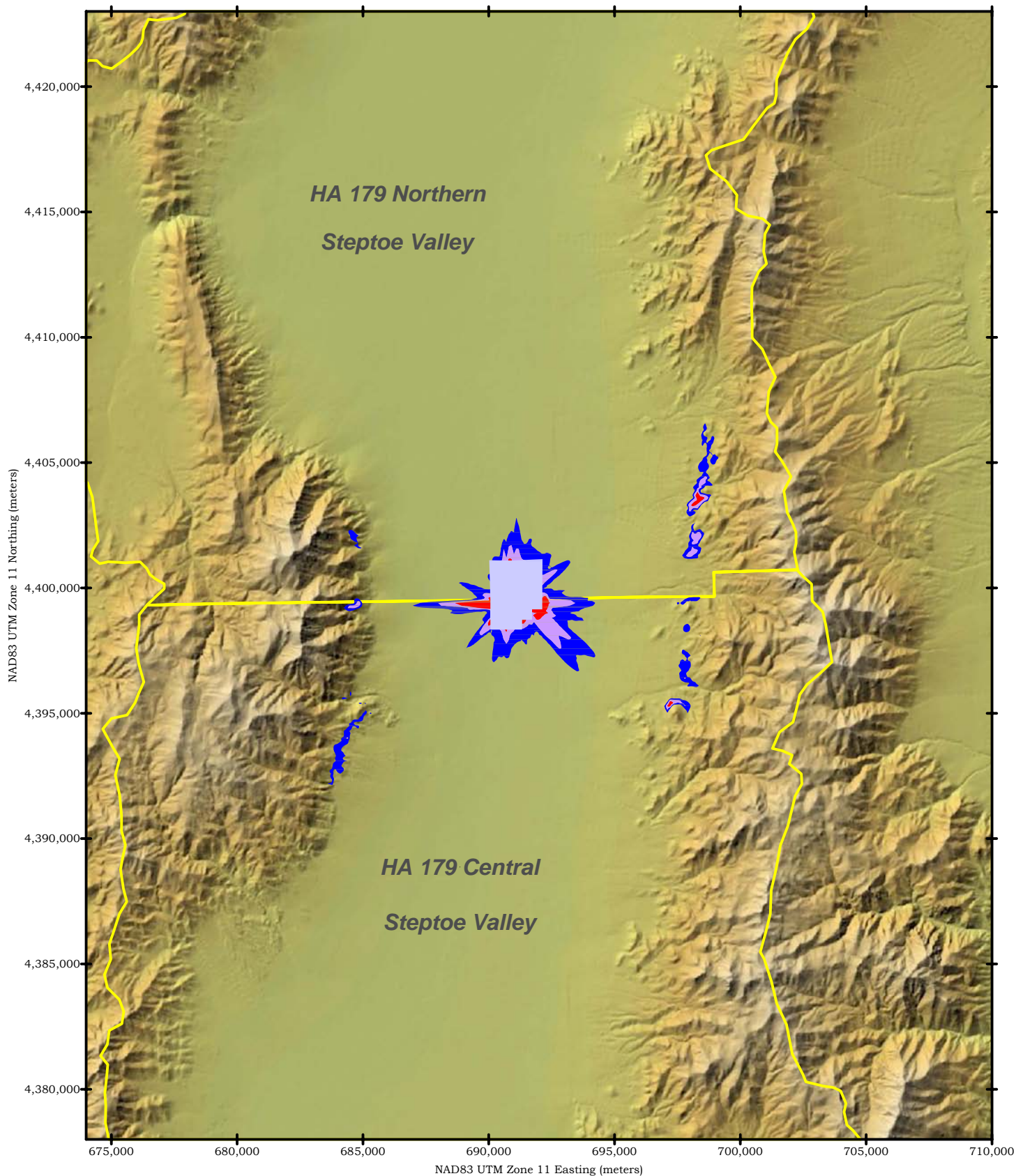
FIGURE 14.14
FULL ANALYSIS
PM10 24-HOUR 2ND HIGH
MAXIMUM IMPACTS
5 YEARS NWS MET DATA
WHITE PINE ENERGY ASSOCIATES

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14.2.4   Start-Up and Shutdown Emissions Analysis

Since startup and shutdown periods will only occur periodically (and with short duration) at the proposed baseload Facility, the startup and shutdown emissions analysis evaluated ambient impacts for all pollutants with short-term averaging periods. The results of the startup analysis are summarized in Table 14.7. The SO_2 and PM_{10} (i.e., pollutants for which the project is significant) results are compared to the NAAQS and Increment standards in Table 14.8 and 14.9. As shown in Table 14.8 and Table 14.9, based on modeling with 5 years of NWS met data, the WPEA Facility is not predicted to cause or contribute to an exceedance of any NAAQS or PSD increment standard.

Table 14.7 - Summary of Facility Startup Impacts Analysis

Pollutant	Averaging Period [1]	Maximum Modeled Concentration ($\mu g/m^3$)
CO	8-hour	118
	1-hour	861
SO_2	24-hour	64
	3-hour	329
PM_{10}	24-hour	17 [2]
HF	24-hour	1.0

[1] Startup modeling was only conducted for short-term (24-hr or less) averaging periods.

[2] Highest second-high impact.

Table 14.8 - Facility Startup Impacts Analysis: Comparison to NAAQS

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
SO_2	24-hour	64	8.0	72	365
	3-hour	329	42.6	372	1,300
PM_{10}	24-hour	17 [1]	30	47	150

[1] Highest second-high impact.

Table 14.9 - Facility Startup Impacts Analysis: Comparison to PSD Increment

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	PSD Increment ($\mu g/m^3$)
SO_2	24-hour	64	91
	3-hour	329	512
PM_{10}	24-hour	17 [1]	30

[1] Highest second-high impact.

8.3 NWS MODELING ANALYSIS AND BUILDING PROFILE INPUT ANALYSIS CD-ROM